

CLAIMS

1. An imaging apparatus for converting, by 2:3 pull-down processing, a 24p imaging signal generated with a frame frequency of 24 Hz according to a progressive scanning system 5 into a 60i signal with a field frequency of 60 Hz according to an interlace scanning system, which is a standard television system, the imaging apparatus comprising:

an imaging section for outputting a 24p imaging signal 10 of one frame over a (1/30) second every (1/24) second in synchronization with a vertical synchronizing signal of the 24p imaging signal;

a delay section for outputting a 24p imaging signal of one frame as it is when the 24p imaging signal is outputted 15 from the imaging section at the same timing as a phase of a vertical synchronizing signal of the 60i signal, and outputting the 24p imaging signal of one frame after delaying the 24p imaging signal by a time during which the 60i signal is subjected to (1/2) field scanning when the 24p imaging signal 20 is outputted at different timing;

a memory section for writing, over a (1/30) second, the 24p imaging signal of one frame having been outputted from the delay section, and outputting a so-called 2:3 pull-down signal, in which two frames of the 24p imaging signal are 25 converted into the 60i signal of five fields by 2:3 pull-down processing, every (1/60) second in synchronization with the vertical synchronizing signal of the 60i signal;

a recording section for recording the 2:3 pull-down signal from the memory section in a recording medium; and

30 a display section for displaying the 2:3 pull-down signal from the memory section.

2. An imaging apparatus for converting, by 2:3 pull-down processing, a 24p imaging signal generated with a frame frequency of 24 Hz according to a progressive scanning system 35

into a 60i signal with a field frequency of 60 Hz according to an interlace scanning system, which is a standard television system, the imaging apparatus comprising:

an imaging section for outputting the 24p imaging signal
5 of one frame over a (1/30) second in synchronization with a vertical synchronizing signal of the 24p imaging signal when the vertical synchronizing signal of the 24p imaging signal is equal in phase to a vertical synchronizing signal of the 60i signal, and starting outputting the 24p imaging signal
10 after delaying the 24p imaging signal by a time during which the 60i signal is subjected to (1/2) field scanning when the signals are not equal in phase;

a memory section for writing, over a (1/30) second, the 24p imaging signal of one frame having been outputted from
15 the imaging section, and outputting, every (1/60) second in synchronization with the vertical synchronizing signal of the 60i signal, a so-called 2:3 pull-down signal in which two frames of the 24p imaging signal are converted into the 60i signal of five fields by 2:3 pull-down processing;

20 a recording section for recording the 2:3 pull-down signal from the memory section in a recording medium; and

a display section for displaying the 2:3 pull-down signal from the memory section.

25 3. The imaging apparatus according to claim 1, wherein in the memory section, two frames of the 24p imaging signal are converted into the 60i signal of five fields by 2:3 pull-down processing, and a mixed signal is generated by adding frames of the 60i signal, the frames corresponding to two or more
30 successive frames of the original 24p imaging signal, and the 60i signal of the fifth field having been converted by 2:3 pull-down processing is replaced with the mixed signal before being outputted.

4. The imaging apparatus according to claim 2, wherein in the memory section, two frames of the 24p imaging signal are converted into the 60i signal of five fields by 2:3 pull-down processing, and a mixed signal is generated by adding frames 5 of the 60i signal, the frames corresponding to two or more successive frames of the 24p imaging signal, and the 60i signal of the fifth field having been converted by 2:3 pull-down processing is replaced with the mixed signal before being outputted.

10 5. The imaging apparatus according to claim 3, wherein the mixed signal is generated by adding a frame including the fifth field and a subsequent frame.

15 6. The imaging apparatus according to claim 4, wherein the mixed signal is generated by adding a frame including the fifth field and a subsequent frame.

20 7. The imaging apparatus according to claim 3, wherein the mixed signal is generated in phase with the fifth field.

25 8. The imaging apparatus according to claim 4, wherein the mixed signal is generated in phase with the fifth field.

9. The imaging apparatus according to claim 5, wherein the mixed signal is generated in phase with the fifth field.

10. The imaging apparatus according to claim 6, wherein the mixed signal is generated in phase with the fifth field.

30 11. An imaging apparatus for converting, by 2:3 pull-down processing, a 24p imaging signal generated with a frame frequency of 24 Hz according to a progressive scanning system into a 60i signal with a field frequency of 60 Hz according

to an interlace scanning system, which is a standard television system, the imaging apparatus comprising:

an imaging section for outputting a 24p imaging signal of one frame over a (1/30) second every (1/24) second in synchronization with a vertical synchronizing signal of the 24p imaging signal;

10 a memory section for writing, over a (1/30) second, the 24p imaging signal of one frame having been outputted from the imaging section, and outputting, every (1/60) second in synchronization with the vertical synchronizing signal of the 60i signal, a so-called 2:3 pull-down signal in which two frames of the 24p imaging signal are converted into the 60i signal of five fields by 2:3 pull-down processing;

15 a recording section for recording the 2:3 pull-down signal from the memory section in a recording medium; and

20 a display section for converting the 2:3 pull-down signal from the memory section into a frame of the 60i signal having one-to-one correspondence with a frame of the original 24p imaging signal in which a fifth field is removed, generating a display signal having a black level signal inserted thereby to have equal frame intervals, and displaying the display signal.

25 12. An imaging apparatus for converting, by 2:3 pull-down processing, a 24p imaging signal generated with a frame frequency of 24 Hz according to a progressive scanning system into a 60i signal with a field frequency of 60 Hz according to an interlace scanning system, which is a standard television system, the imaging apparatus comprising:

30 an imaging section for outputting a 24p imaging signal of one frame over a (1/30) second every (1/24) second in synchronization with a vertical synchronizing signal of the 24p imaging signal;

35 a memory section for limiting a vertical band of the 24p imaging signal of one frame having been outputted from the

imaging section, writing the signal in a memory area over a (1/30) second, and outputting a so-called 2:3 pull-down signal in which two frames of the 24p imaging signal are converted into the 60i signal of five fields by 2:3 pull-down processing,
5 every (1/60) second in synchronization with a vertical synchronizing signal of the 60i signal;
a recording section for recording the 2:3 pull-down signal from the memory section in a recording medium; and
10 a display section for displaying the 2:3 pull-down signal from the memory section.

13. The imaging apparatus according to claim 12, wherein the memory section limits the vertical band by adding vertically adjacent two lines of the 24p imaging signal.

15 14. The imaging apparatus according to claim 12, wherein the memory section is capable of outputting a 2:3 pull-down signal obtained by 2:3 pull-down processing after limiting the vertical band of the 24p imaging signal and a 2:3 pull-down
20 signal obtained by 2:3 pull-down processing without limiting the vertical band, the memory section outputting the latter 2:3 pull-down signal to the recording section and outputting the former 2:3 pull-down signal to the display section.

25 15. The imaging apparatus according to claim 13, wherein the memory section is capable of outputting a 2:3 pull-down signal obtained by 2:3 pull-down processing after limiting the vertical band of the 24p imaging signal and a 2:3 pull-down
30 signal obtained by 2:3 pull-down processing without limiting the vertical band, the memory section outputting the latter 2:3 pull-down signal to the recording section and outputting the former 2:3 pull-down signal to the display section.